

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN AND RELATING TO TELECINE APPARATUS

(71) We, BRITISH BROADCASTING CORPORATION, a British Body Corporate of Broadcasting House, London, W1A 1AA, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a method of and apparatus for detecting the presence of dust, hairs and other dirt as well as blemishes such as scratches and indentations on the surface of a cine film whilst it is running in a flying-spot telecine machine.

The presence of such imperfections, particularly on 16 mm. film, is a serious problem. They are clearly visible and have a severely degrading effect on picture quality. There is nothing subtle about this fault, viewer tolerance is low and the defect is always regarded as symptomatic of carelessness and low class standards.

There is therefore a powerful incentive to improve film cleanliness, and this has been increased recently by the advent of direct reproduction of colour negative in the telecine machine because dirt then appears as very noticeable white spots (known as "sparkle"). This problem has always existed in the printing laboratory, of course, but is less acute because of a cleaner environment and illumination in the printer which is more diffuse than in the flying-spot telecine machine.

Considerable effort has been put into keeping film clean and cleaning it when dirty, but such techniques, whilst necessary to keep the amount down, cannot eliminate dirt completely and furthermore can be costly and difficult to apply. The ultimate method has been to use a "liquid gate" in the telecine machine in which the film faces are coated with a liquid layer which smooths out the surface and renders dirt and scratches must less visible. Such a method is not really practical in a telecine machine although it is normal in a laboratory optical printer.

Our invention is based on the realization

that it might be possible to suppress such imperfections by electronic means. The problem is one of distinguishing between required picture detail and unwanted dirt or other imperfections. In accordance with this invention we propose distinguishing by optical means, by detecting light scattered by the imperfections.

According to this invention there is provided a method of detecting imperfections on a film whilst in a flying-spot telecine machine, in which the amount of light from a flying-spot scanner which is scattered by the film is detected and used to provide an electrical signal indicative of the presence of imperfections. Preferably this signal is used to suppress the effect of the imperfections electronically.

According to the invention there is also provided a flying-spot telecine machine provided with means for detecting imperfections on a film whilst in the machine, the said means comprising means for detecting light from a flying-spot scanner which is scattered by the film and providing therefrom an electrical signal indicative of the presence of imperfections.

The invention is applicable principally to colour cine film. Conventional monochrome film itself produces considerable scatter from the silver image which makes its use with the invention difficult. However the dye image of a colour film has very different scattering properties from superficial dirt or indentations, the latter producing a high degree of scatter whereas the dye image causes very little scatter. The dust particles and scratches do not generally absorb much light, but rather they redirect it away from the photocell of the telecine machine and thus it is interpreted by the telecine machine as absorbed.

A flying-spot telecine machine embodying the invention will now be described in more detail, by way of example, with reference to the drawing accompanying the Provisional Specification, which shows a diagrammatic side view of the telecine machine and the electrical circuitry connected to it.

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PROVISIONAL SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

